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THE PATHOLOGY AND TREATMENT OF WHITE SWELLING OF THE KNEE.

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THE PATHOLOGY AND TREATMENT OF WHITE SWELLING OF THE KNEE.[1]

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PATHOLOGY, or knowledge concerning disease, may be said to be the prime requisite of the physician. It often stands higher in public estimation than the ability to cure. In the case of a patient whose symptoms are equivocal, for whom advice is sought in different directions, the physician who is in attendance when the nature of the disease finally declares itself has undisputed control. As knowledge goes before opinion, advice, prescription or operation, pathology should take the precedence in our medical studies. But how changeful is our Pathology! How fickle a divinity! It is said that the average life of a pathological doctrine is about 30 years. We learn, but with the prospect of having to unlearn; and the all-wise, unwise, public senses this and goes doubtfully away, "trembling, hoping, lingering, flying," to fanes where the divinities are not only fickle but meretricious.

In the consideration of the present subject, however, we are in a field where pathology and therapeutics have some of the stability of an exact science. It is a settled pathological doctrine that inflammation is prolonged by the exercise of the affected part. White swelling of the knee goes from bad to

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worse as long as the patient continues to subject the joint to the weight of the body when standing and the severe traumatism attending walking and running. It is surmised, and with good reason, that the foci in which are started the flames of articular osteitis, appear also at times in the bones of the upper extremity, but these being exempt from the forced drafts of traumatism which attend the machinery of locomotion, are in due time resolved and are thus but rarely recognized. The almost entire absence of shoulder disease, white swelling of the elbow and pulpy disease of the wrist is to be explained in this manner.

Based on this pathology is the positive prescription; give cessation of function to the inflamed bone and joint of the knee by arresting the double function of motion and weight-bearing. I am accustomed to do this in a certain way. To arrest motion a posterior upright is employed which extends sufficiently far above and below the knee to give an efficient leverage. It is padded at its ends to make comfortable counter-pressure from behind forwards at the upper part of the thigh and the lower part of the leg, and it carries two cross-pieces, each half surrounding the limb, but not touching it, with four buckles at the ends of the cross-pieces in which are adjusted the two padded straps crossing the front of the limb to make pressure from before, backwards, above and below, and near the knee. This fixative brace is worn day and night.

To arrest the weight-bearing function the ischiatic crutch is used. This is worn only when the patient is up. It may be said to put the limb to bed

while the patient runs about. It is applied with a high sole on the foot of the unaffected side. A point requiring especial attention in the adjustment of this crutch is the length of the seat strap. If, on the one hand, this padded strap is too long it allows the pelvic band to take too high a level whereby it makes uncomfortable pressure on the anterior superior iliac spine. If, on the other hand, the strap is too short it holds the pelvic band at too low a level, thus causing painful pressure on the pubes.

In a case in which the knee is unduly flexed the fixative brace may be used to correct the deformity, by taking advantage of the tractable quality of the steel, the knee and the brace having imparted to them, first one and then the other, an additional modicum of extension, or straightening. This is accomplished by buckling the pressure-straps tighter and straightening the brace by the use of the vise and monkey-wrench.

Each case will be found to have its own peculiarities and contingencies and troublesome details which will have to be met individually. In general the success of mechanical treatment depends very much on the cooperation of the patient or, in the case of children, on that of the parent or other immediate attendant. It is often not out of place to say to the mother that the brace is to be worn not only on the child's limb but in her head.

The difficulty of securing proper attention at home to the details of treatment will generally be found to be the true explanation of failure to secure the best results. It is seen in some patients, who for

this reason have failed to secure the best results, that the deficiencies occur chiefly in the line of efforts to secure final straightness of the limb. This is no trivial defect, because a knee ankylosed at a considerable angle is a source of lameness and disability. But as the prevention and the correction of flexion of the knee lie well within the power of so simple a mechanical device as a lever properly applied, a serious degree of flexion cannot become a feature of the result in a case in which medical attendance is rightly seconded by good management at home.

Case I. *Incipient.*—A girl aged six years eight months was brought in on September 15, 1899, with a slight lameness in the right knee without pain. This had been noticed for about five weeks. In walking she accentuated the action of the left foot in order to throw the weight of the body on that limb rather than on the affected one. The left thigh four inches above the patella measured 11 inches, knee 9 inches, leg 8 3/8 inches; the right 10 3/8—9 3/8. The knee flexes 20°—170°. Manual attempts at further extension develop marked reflex. The patient illustrates the ease and convenience with which the ischiatic crutch, which was applied September 20, 1899, is worn. Extension of this knee could easily be made in a short time by the use of the fixative brace, which has not yet been applied. It will be of interest to note whether relieving the limb from the weight of the body will not of itself, without fixing the joint, lead in time to resolution with restoration of normal motion.

Case II. *Complicated with Pott's Disease. Flexion Reduced.*—A boy four years of age had been lame in the left knee for one year. Flexion 20°—125.° A crutch was applied November 19, 1897, and fixative

brace on February 7, 1898. Pott's disease appeared in the lumbar region and a spinal brace was applied December 12, 1898. Prognosis good. The knee is at 2°, practically straight. The three braces are easily and comfortably worn. The advantage of holding the pelvic band of the ischiatic crutch down to its proper level by a short seatstrap is emphasized in this case by the ample room which is thus left for the efficient application of a spinal brace.

CASE III. *Flexion Reduced. Absorption of Abscess.*—The patient, a five-year-old girl, came for treatment for the right knee, which had been lame for four years, January 18, 1897. Moderate subluxation. Flexion 55°—125°. Abscess attended by severe pain appeared at the outer and anterior side of the knee. The ischiatic crutch was applied March 5 and a fixative brace March 9, 1897. The apparatus is still worn. Prognosis good. The abscess has been nearly absorbed, and the knee is flexed 6°. Subluxation persists, but the femur is so far superimposed over the tibia that the stability of the limb will not be compromised.

CASE IV. *Flexion Reduced. Many Abscesses.*—A boy, aged one year and nine months was brought on August 26, 1895, with lameness of the left knee which had lasted a few weeks. Knee at 90°. A year later when he was again seen it was far advanced in destructive osteitis. Numerous sinuses on all sides of the knee; subluxation; general condition low. The fixative brace was applied with relief of the symptoms. Six months later the ischiatic crutch was applied. With this apparatus in place, the patient was at once active on his feet. The discharge is now moderate in quantity and some of the sinuses have cicatrized. The general health is good and prognosis favorable. The apparatus is still worn. The knee is at 10°; moderate subluxation. Fre-

quent long absences, one of them for sixteen months and two for seven months each, have marked the history of this case and have doubtless delayed recovery. In these intervals it is probable that the anxious mother consulted other authorities and the question of excision was probably duly considered. If the child's general condition was good at the time it might have been said, either that it was safe to continue to rely on mechanical treatment, or that excision would be well borne and should be done to hasten recovery. If, on the other hand, the general condition was bad, as it was at times in the extreme, it might have been said either that excision was necessary to save life or that the chances of recovery were not good enough to permit a resort to operative intervention. The present condition, however, gives good ground for confident expectation that the final result will be combined straightness, length and stability of limb in greater degree than may be looked for after excision.

CASE V. *Abscesses. Recurrence of Flexion after Recovery.*—A girl three years and four months of age had been lame for six months in the left knee. Marked flexion. Left knee $8\frac{1}{8}$; right knee $7\frac{1}{8}$ inches. On January 24, 1889, the fixative brace was applied and three months later the flexion was entirely reduced. The ischiatic crutch was applied March 18, 1889. In August, 1889, and June, 1890, sinuses appeared which were finally cicatrized in August 1890. In July, 1892, a third abscess opened and two months later had finally closed. In October, 1894, motion was between hyperextension 5° and flexion 30° and treatment was suspended. In October, 1898, there had been no symptoms, but the knee was flexed with motion between 28° and 48°. The fixative brace was re-applied, against the patient's will, and flexion has been reduced to 10°,

with good prospect of complete reduction. No subluxation. She now prefers to retain the brace and would not mind wearing it always, feeling that it adds greatly to her ability to walk and run. This will probably not be necessary. When the bones are mature their articulating surfaces will adapt themselves to each other so that the femur will rest securely on the tibia in the straight position.

CASE VI. *Deformity after Incision. Not Reduced.*—A girl ten years of age had suffered with the left knee for three years. Two operations for tuberculosis of the knee had been performed in general hospitals. The articulating surfaces had been sawn off and the knee was practically motionless at 35° of flexion. The fixative brace was applied for the correction of the deformity in March, 1896. It is still worn. The knee was at one time at 20°. It is now at 30°. The brace has been worn constantly, and the patient's attendance at the dispensary has been regular, but the prospects are that the flexion will be a permanent disability. It has been impossible to inspire the patient or her parents with confidence in the efficacy of mechanical means. The case illustrates what has been said about the way in which medical attention may be thwarted by a failure to secure cooperation in the patient's home.

CASE VII. *Deformity after Operation. Reduction.*—A three-year-old girl, lame in the left knee, was brought August 2, 1895. Flexion at 22°. The fixative brace was applied August 9, 1895. The flexion has been completely reduced, but has been permitted to return. It is now 12°. The patient is likely, however, to have a straight limb, as the ankylosis is not very firm and the child, with good parental care, is approaching an age when she will, as happened in Case V., take a personal interest in her own case.

CASE VIII.—Boy, aged seven years and six

months, lame for eighteen months in the right knee; the fixative brace was applied January 24, and the ischiatic crutch January 27, 1893. The patient was presented to the Orthopedic Section on April 20, 1894. The crutch was discontinued in September, 1896, and the fixative brace in January, 1897. The knee now flexes 8°—75° and imparts no defect to his ordinary walking gait.

CASE IX. *Reduction of Flexion of Ten-Years' Standing.*—A boy fourteen years of age, had been lame from infancy in the left knee. Beyond the swelling and limitation of motion there had been but little trouble for ten years. Flexion 25°—55°. The fixative brace was applied to straighten the knee March 23, 1891. In March, 1893, the knee was straight and in July, 1894, it was hyperextended 10°. The brace was removed in January, 1896. At present flexion is 0°—20°, a result largely due to his intelligent interest in the progress of his own case.

CASE X. *Recurrence of Flexion. Abscesses.*—A boy of eight years had for four years suffered with his right knee. Marked subluxation. Flexion 30°—80°. Sinuses. In March, 1885, the Thomas splint for protecting the limb from the weight of the body, and a fixative brace were applied. The patient was presented to the Orthopedic Section on March 19, 1886. On January 8, 1887, the ischiatic crutch was applied in place of the Thomas splint. The knee was straightened and at one time was hyperextended 2°. The sinuses closed. At present the flexion is at 25° with marked subluxation and very little motion, a result due partly to the late stage at which treatment was begun and in large measure to a failure, too often encountered, to obtain thorough cooperation.

CASE XI. *Mild Case. Abscesses. Result 20 Years after Treatment.*—A boy six years of age had had for five months, swelling, pain, and limited motion

of the left knee; on May 7th a Thomas splint and on May 13, 1878, a fixative brace were applied. In the following summer a sinus appeared and the abscess discharged for four months. Several pieces of cancellous bone were extruded, one of them being evidently a fragment from the surface underlying the articular surface of a femoral condyle. The fixative brace was removed in February and the Thomas splint in April, 1879. There was ¾ of an inch lengthening and recovery with normal motion and locomotor ability. As the patient was traveling he could not be present at the meeting. Inspection, however, would have revealed nothing objective, except a depressed scar, 1½ x 1, attached to the inner condyle. He says that when being measured for clothes the limb is a ¼ of an inch longer than the unaffected one. There were exceptional reasons for expecting a good result in this case. Among them was the probability that the affection was of a comparatively mild character. It was not the typical insidious osteitic invasion, after which we may, as a rule, be glad to secure a strong, straight and useful limb, albeit motion may be limited or absent from the joint.